



*Readiness and Training Office*

*Advanced Distributed Learning*

# **Job Performance and Mentoring Systems**

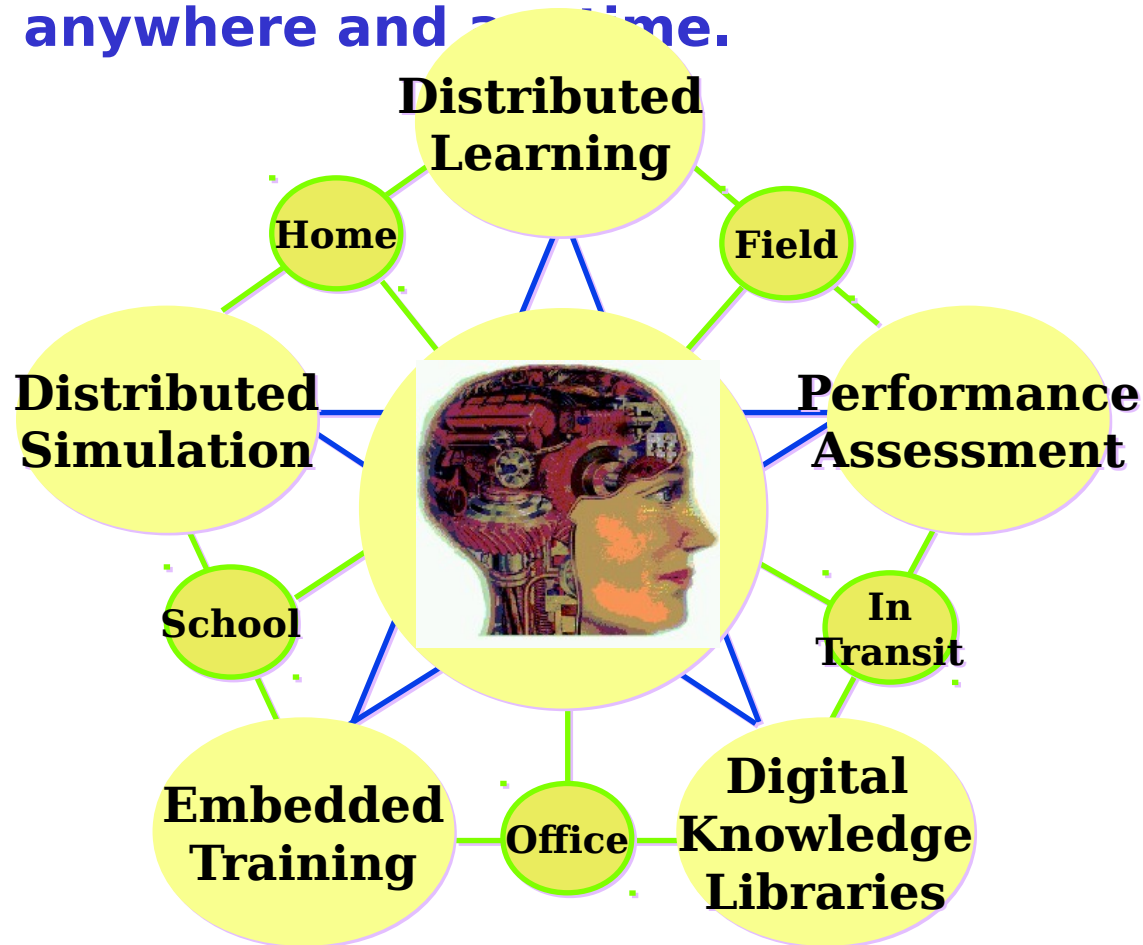
**Readiness and Training Policy and Programs  
Office of the Secretary of Defense  
(703) 695-6940**

# The ADL Vision

*Readiness and Training Office*

*Advanced Distributed Learning*

**Provide access to the highest quality education and training, tailored to individual needs, delivered cost effectively, anywhere and anytime.**



# The ADL Strategy

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- ◆ **Exploit existing network-based technologies**
- ◆ **Create platform-neutral, reusable content and courseware to lower costs**
- ◆ **Promote widespread collaboration to satisfy common needs**
- ◆ **Enhance performance with emerging and next-generation learning technologies**
- ◆ **Develop common specifications and guidelines**
- ◆ **Establish a coordinated implementation process**

Maintenance .....  
Today





# Overview - Current Environment

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- **Young force (33% annual turnover at O & I Level Maintenance)**
- **Op tempo at all-time high**
- **Aging force (Depot Maintenance)**
- **Expertise stretched thin**
- **R&R of non-faulty components above industry standard of 30%**
- **Low confidence in technical documentation**
- **Lengthy training cycles**
- **Insufficient available spares**

# Maintenance Problems

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- **Only 85% can be diagnosed with published procedures\***
- **Must develop own diagnostics where no published fix available**
- **Intermittent problem**

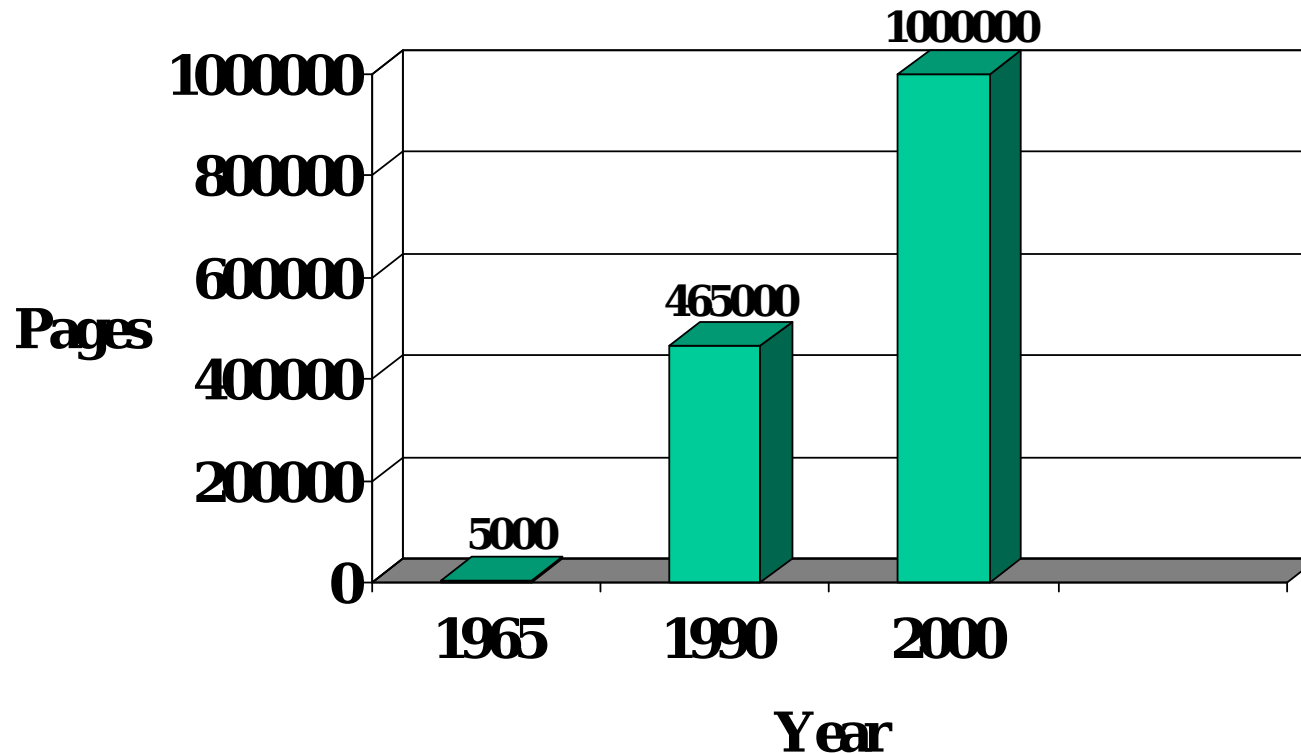
\* Using procedures supported with knowledge

# New Technology Causing an Information Explosion

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**Increase of Vehicle Service Information**



Source: U.S. Dept. of Transportation and ASE

# Resultant Problems

**Greater potential for error when:**

- **Procedure is complex**
- **Steps are lengthy**
- **Page has many steps**

**ETM's can add to problem**

- **Reading speed reduced by 50%**
- **Book/Table of Contents**
  - **Organized for use as a reference**



# **ADL Job Performance & Mentoring Goals**

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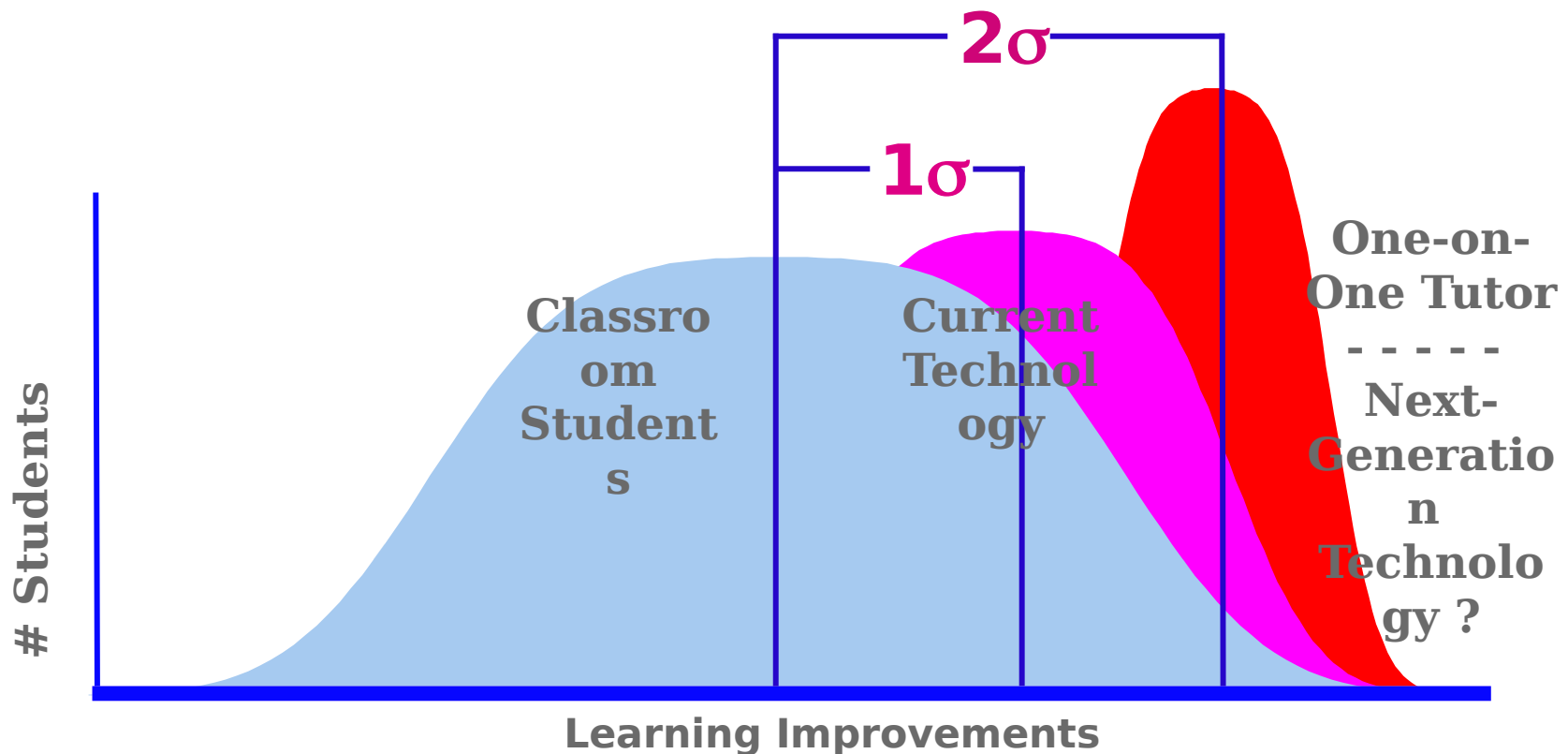
- **Lower cost of maintenance 5-10%**
- **Develop smarter, more capable workforce**
- **Impart experience as well as technical information on the job (learning occurs best while doing)**
- **Support generalized maintainers**
- **Promote technical feedback from users**
- **Use leading-edge COTS technology**
- **Create Open Architecture design**

# Payoff for Investing in Human Cap

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**Average tutored student's achievement is better than 98% of classroom students**



Adapted From: Bloom, B.S. The Two-Sigma Problem: The Search for Methods of Group Instruction as Effective as One-to-One Tutoring. Educational Researcher. 13.4.16 (1984)

# **Learning Technologies Benefits**

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- **Education and training distributed to any location -- at any time**
- **Efficient use of student /teacher time**
- **30% increase in student achievement**
- **30% reduction in training time**
- **30% reduction in costs**
- **Research with Intelligent Tutor technology indicates potential for greater benefits**

# **Job Performance Mentoring Systems**

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## **Electronic Performance Support System (EPSS)**

- **Combination of:**
  - **IETM (procedures)**
  - **Training (knowledge)**
- **Delivered during the job**

# Changing Needs of the Maintainer

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- Quality and variety have increased the time between seeing the same problem to several months
- Complexity of technology has increased how much knowledge is needed
- Knowledge gained through classroom training is virtually all but lost by the excessive time between seeing the same problem
- Equipment advances outpacing information “tools”

# Technology is Ubiquitous

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- **Microprocessor systems on today's cars:**

Engine      Transmission

Air Conditioning      Radio

Cruise Control      Lighting

Antilock Brakes      Air Bags

Speed Sensitive Power Steering      Alarm systems

Remote Keyless Entry      Cell Phones

Retained Accessory Power      Smart Clusters

Electronic Level Control      Memory seats

Driver Information Centers      GPS mapping Steering

Wheel Controls      Elect. Compass

Forward Looking Infrared Display      Memory Mirrors

Electrochromatic Mirrors Head Up Display

Daytime Running Lights      Twilight Sentinel

Express down windows      Chime modules



# Changing Need - Inside

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- All pertinent technical data
- Technical information beyond the manuals (experience)
- Easily accessible
- Search engine for references
- Task-based menus based on workflow
- Just what the technician needs (no fluff)
- Just-in-time, task-based training
- Configuration management

# Changing Need - Outside

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- **Marine/Sailor resistant (nothing is Marine- proof)**
  - “Ruggedized”
  - Environmental conditions
- **Hands-free operation**
- **Portability**
  - Long battery life
- **Flexibility**

# Determination

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- **Getting there is taking too long.**
- **Concentrate on the inside.**
- **Let technology advances take care of the outside.**
- **Fulfill ADL mandates**
  - **Open Architecture, COTS, Reuse**

# User Interfaces

Readiness and Training Office Advanced Distributed Learning

What happens when you  
put all of the procedures  
*and* training on one  
system?

# Sample H-1 MMS Screen

Go Back Go Next STOP Refresh Go Home News Zoom In Zoom Out ? Exit Heard: no

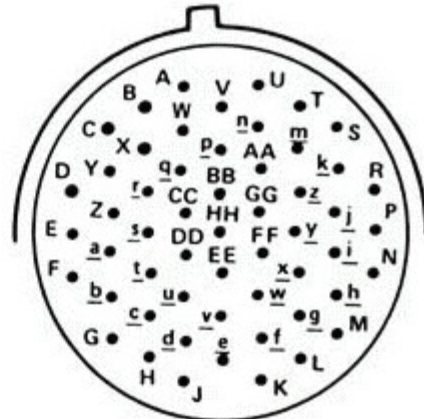
Check for 28 vdc at  
19 A 9 J 1-J.

Is 28 vdc present? YES NO

References:

Schematic

Animated Schematic



19A9J1



H-1  
Maintenance  
Mentoring  
System  
(MMS)

-One of Two  
OSD(AT&L)  
and (P&R)  
Sponsored



# Prototypes

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- **Get a prototype out for evaluation**
  - **Web-based technologies**
  - **COTS hardware**



# Goals of H-1 MMS Phase I

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- **Restructure the content from reference to EPSS**
- **Provide leading-edge COTS technology to deliver the content during-the-job**

# **Demonstration**

# H-1 MMS Phase I Outcome

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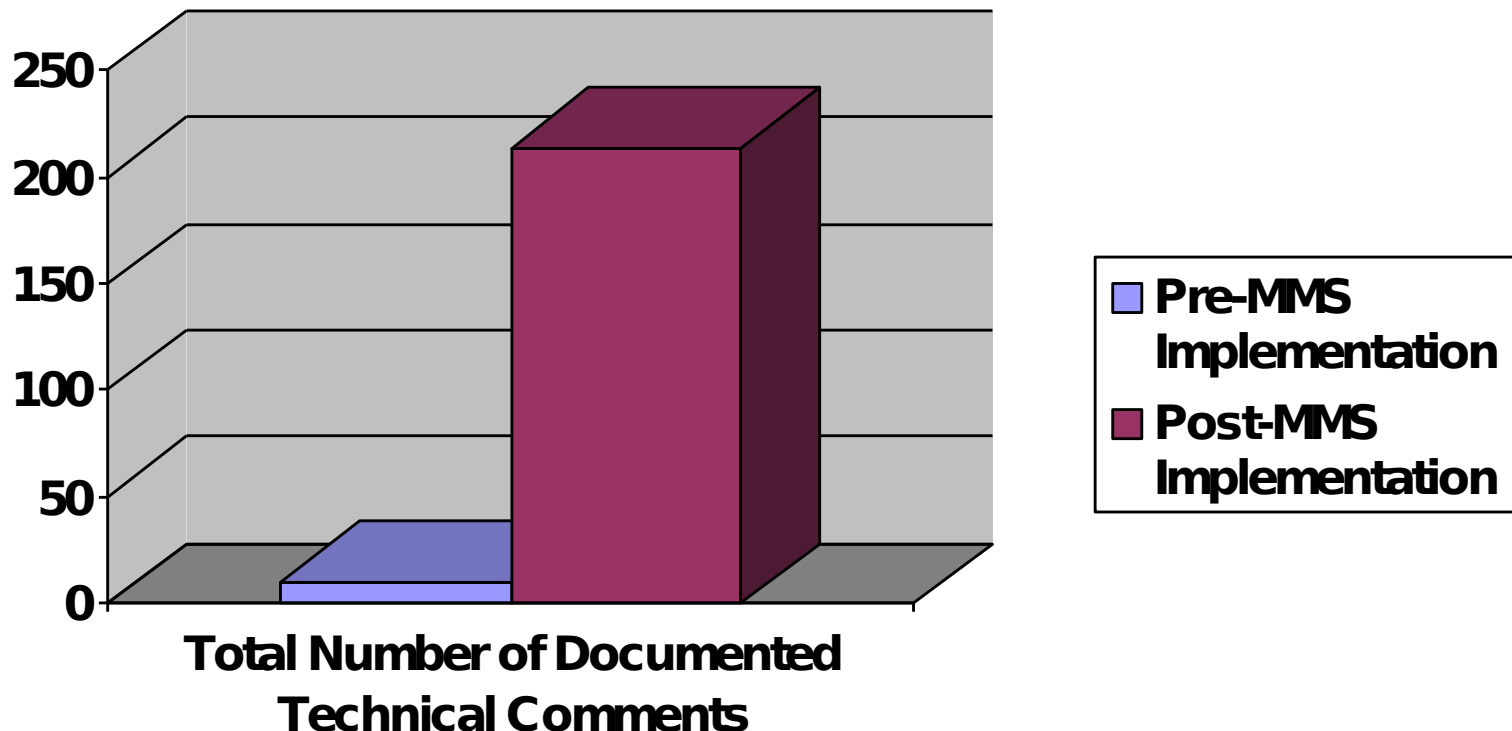
- **Accessible and usable information**
  - 15-20 min to train Marines to navigate MMS
- **Increased comprehension and retention**
  - Animated schematics
  - Text-to-speech procedure output
- **Widespread acceptance**
  - Technicians embraced the system for using large amounts of information during actual working time

# H-1 MMS Phase I Outcome

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- **Unprecedented Levels of Interaction**

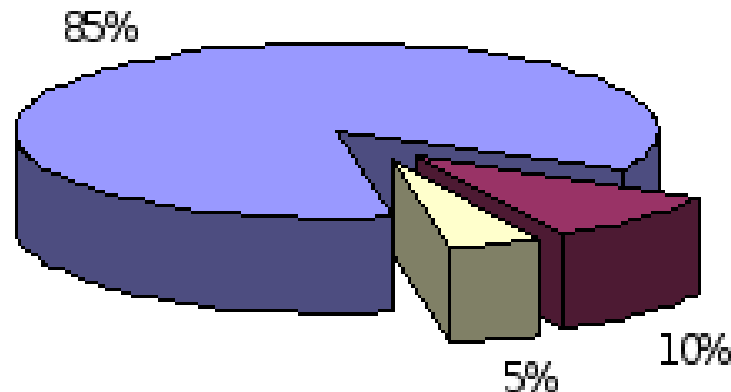


# H-1 MMS Phase I Outcome

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- **Improved Technical Content**



- Technical Content Feedback (214 items)
- System Performance (24 items)
- General/Miscellaneous (12 items)



# **H-1 MMS - Prototype Travels**

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- **FREST Camp Pendleton, CA**
- **HMLA-169**
  - **Okinawa Japan: summer, rain, humidity**
  - **Australia: hot summer**
  - **Korea: cold winter**
  - **USS Belleauwood: shipboard operations**

# Prototype Winners

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- **Ease of use**
  - Touch, voice, mouse, keyboard
  - Web page outline
  - Logical flow
- **Rapid access of needed information**
- **Right information, right time**
- **“Tool of choice”**

# Anecdotal Feedback

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“System became first item to be grabbed by Ordnance Personnel in the event of a TOW or Hellfire gripe.” GySgt Jones, R.L., HMLA-169

“Easy to use and understand by all personnel whether beginner or expert.” Sgt Rhodes, J.G., FREST 303

“Provides the flexibility to be used as a student station, homework tool, laboratory reference, and flightline troubleshooting tool.” Capt Tyre, T.A., FREST 303

# Anecdotal Feedback

*Readiness and Training Office*

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“Excellent potential to be primary troubleshooting tool for TOW & Hellfire systems.” GySgt Jones, R.L., HMLA-169

“The MMS was the tool of choice for HMLA-169 Ordnance Division while deployed to WestPac.” GySgt Jones, R.L., HMLA-169

# Summary

## Job Performance & Mentoring

Readiness and Training Office **Systems**

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- ✓ Provide a seamless connection between worker and schoolhouse
- ✓ Reduce data architecture stovepipes
- ✓ Promote greater “information” configuration control
- ✓ Directly attack readiness by reducing maintenance errors
- ✓ Improve overall time to repair
- ✓ **ROI can be realized in a short period of time**

# **BACK UP Slides**

## **Origin and Goals of the ADL Initiative**



# Quadrennial Defense Review - Findings

Despite the benefits promised by learning technologies, only a small percentage (about 4%) of military courses used any type of learning technology

After initial investments of \$100M/year for 5 years, about \$400M could be saved each year thereafter

Collaboration in developing and sharing similar courses could reduce costs

Development of object-oriented (reusable) courseware would permit resource sharing

R&D investments in the next generation of learning technology is needed

# Quadrennial Defense Review - Directi

The Deputy Secretary of Defense directed the development of a department-wide strategy to harness the power of learning and information technologies to modernize education and training.

**There were several significant challenges to be overcome:**

**Although there was ample evidence that significant savings were possible with current technology, the ever-quicken pace of technological change, with its continuous evolution of proprietary platforms, makes it difficult to implement technologies on a large-scale.**

**On the other hand, these newer technologies have the potential to provide a more efficient and effective means of improving military readiness, achieving significant savings, reducing travel, and improving**

# Deputy Secretary's Tasking

(11-23-98)

Produce an **ADL policy** for developing and implementing ADL technologies across the Department

Develop an **ADL Master Plan** that addresses the plans, programs, and procedures necessary to carry out the policy

Ensure that sufficient **programs and resources** are made available to implement the ADL Master Plan

Provide the DoD ADL Strategic Report to the Congress and the ADL Master Plan to me **not later than Feb 23, 1999** and **April 9, 1999**

# Congressional Tasking

(FY 99 Defense Authorization Act)

## The plan shall, at a minimum:

- Provide measurable goals and objectives for the development and execution of ADL initiatives throughout DoD.
- Describe planned expenditures for the investments necessary to build and maintain that infrastructure.
- Assess estimated costs and benefits of developing and maintaining an appropriate infrastructure for distance learning.
- Describe how ADL initiatives are to be developed and managed within the Department of Defense.
- Describe the mechanisms that are to be used to

**supervise the Secretary shall present to Congress a Strategic Plan by 3-1-99, and a detailed Implementation Plan and budget no later than 7-30-99.**

# Executive Order 13111

## Tasking

(1-12-1999)

**The Department of Defense shall:**

**Lead Federal participation with business and university organizations in developing consensus standards for training software and associated services; and**

**Provide guidance to Defense agencies and advise the civilian agencies, as appropriate, on how best to use these standards for large-scale development and implementation of efficient and effective distributed learning technologies.**

# The ADL Strategy

- ◆ Exploit existing network-based technologies
- ◆ Create platform-neutral, reusable content and courseware to lower costs
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- ◆ Establish a coordinated implementation process

# **DoD ADL Implementation Plan - Key Steps**

## **Spring to Winter 2000**

**Conduct series of “Plugfest” to test, validate, and refine the SCORM**

**Complete development of SCORM compliance-testing software**

**Encourage collaboration across DoD, academia, and private sector**

**Encourage vendors to incorporate SCORM V1.0 into their products**

**Release Version 2.0 in early Fall 2000**

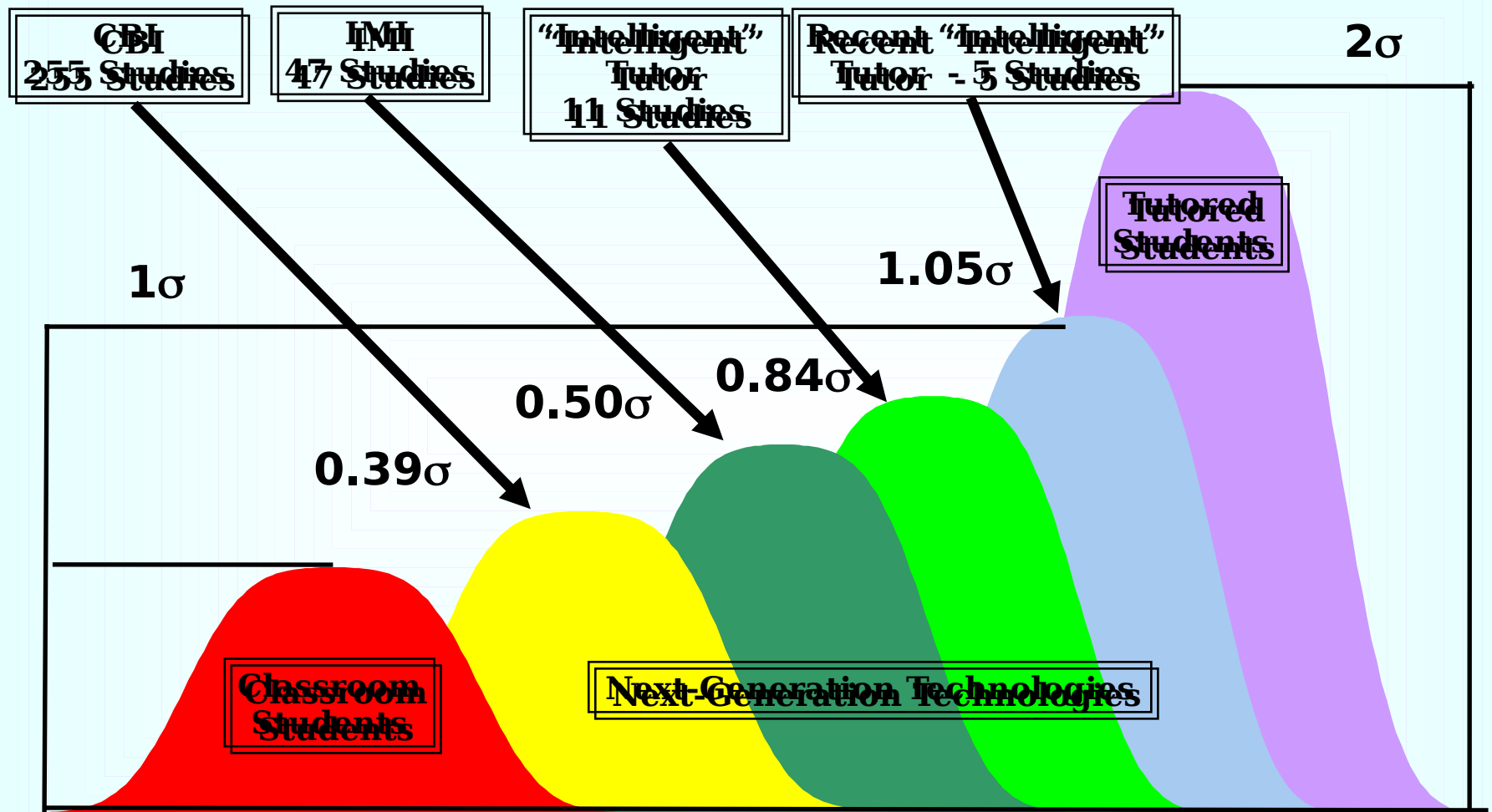
**Work with standards groups for SCORM adoption**

# What is Needed to Create the Future Learning Environment?

- Recognition of common challenges and common solutions
- Common vision of the future learning environment
- Strategy for achieving the vision
- Documenting functional requirements of the new environment
- Process for collaboration - R&D, testing, and sharing resources
- A broad set of goals and expected benefits
- Prototypes and incentives to motivate change



# Payoff for Investing in Human Capital



# **The President's Executive Order 13111**

**Tasked the DoD to lead Federal participation with business and university groups and activities, charged with developing consensus standards for training software and associated services.**

**The specific goals were to:**

**Identify and recommend standards for training software and associated services purchased by Federal Agencies and Contractors;**

**Facilitate and accelerate the development of key technical training standards in industry and in standards-development organizations; and**

**Establish guidelines on the use of standards and provide a mechanism to assist DoD and other Federal Agencies in the large-scale development, implementation, and assessment of interoperable and reusable learning systems.**

# High-Level Direction

**QDR: Develop a strategy (DoD) and master plans (services) for using learning technologies on a broad scale**

- Deputy Secretary's Direction
- President's Executive Order
- Congressional Direction